A.3.7 SWMU 34

Description

SWMU 34 consists of a dumpster area and stream located in the Central Yard, south of the Shops and Reclamation Building, and east of the LPG loading rack. Chevron has recently installed railroad sidings in this area. This area was originally identified based on an odor complaint received by the Middlesex County Department of Health on April 5, 1983. The odor was traced to the dumpster area, where the offending substance was later determined to be catalyst from one of the Refinery SRUs, which had been placed in one of the dumpsters. While no reportable spills have occurred in this area, some patches of asphalt from small overflows from the dumpsters containing liquid asphalt were observed in this area in April 1991.

During the 1st-Phase Soils Investigation, the greatest potential for releases were anticipated to be restricted to three zones based on a detailed sketch prepared of the dumpster area during a 1991 site reconnaissance. These areas are as follows:

- Zone 1 (Concentrated Drum and Dumpster (Asphalt Lugs) Staging Area) is approximately 170 feet by 65 feet;
- Zone 2 (Concentrated Drum Staging Area) is approximately 115 feet by 30 feet; and
- Zone 3 (Dumpster Loading and Unloading Platform) was approximately 70 feet by 70 feet. The elevated dumpster loading area was positioned on a concrete pad, which was removed in approximately 1992. A new railcar loading rack has since been constructed in this area.

As summarized on Table A.3.7, 31 borings, 39 soil samples, four monitoring wells, three hydropunch samples, three sediment samples, and three surface water samples have been used to characterize this SWMU. Nine soil samples were analyzed for VOCs, SVOCs, metals and PCBs during the 1st-Phase Soils Investigation, and 19 soil samples were analyzed for VOCs, SVOCs and metals during the Full RFI. An additional 12 samples were analyzed for PCBs during the full RFI. One sample was analyzed for SPLP metals and other physical parameters.[1] During the second iteration of the Full RFI, eight soil samples were analyzed for BTEX, two samples were analyzed for PAHs, and 10 samples were analyzed for selected metals.

Soils

Refinery fill material was used to elevate the existing ground surface in this area. Catalyst beads were encountered two to four feet bgs in S1432 (MW-169), SB-0143, SB-0148, and U034-004. Evidence of construction debris, staining and petroleum odors was

[1]Physical characteristics specified in Appendix A, Task IV of Module III of the HWSA Permit included saturated and unsaturated permeability tests, moisture content, relative permeability, bulk density, porosity, soil sorptive capacity, CEC, TOC, pH, Eh and grain size distribution.

also observed in a number of the borings. A white and pink putty-like material was also observed at depths ranging from eight to 19 feet bgs at S1393, S1394, S1396, S1398, S0727, S0728 and U034006. Evidence of petroleum impacts was observed at S0727 and S0728.

Benzene, PAHs and metals have been detected above the applicable soil delineation criteria at SWMU 34. In general, benzo(a)pyrene and lead are present in samples where other COCs are present above their respective delineation criteria.

The following table summarizes the number of samples where the delineation criteria were exceeded:

Constituents of Concern	Surface Soils (0 to 2 ft)	Fill Material (>2 ft)	Native Soils	Total
Benzene	0/5	2/20	1/11	3/36
Other VOCs	0/5	0/20	0/11	0/36
Benzo(a)pyrene	1/5	3/17	0/8	4/30
Other PAHs	0/5	5/17	0/8	5/30
Antimony	1/5	2/16	0/7	3/28
Arsenic	0/5	2/21	6/12	8/38
Barium	0/5	0/16	1/7	1/28
Beryllium	0/5	1/16	0/7	1/28
Lead	0/5	4/21	5/12	9/38
Nickel	0/5	1/17	0/8	1/30
Zinc	0/4	0/12	1/11	1/27

Surface Soils

Staining and odors were noted in surface soils at several borings at SWMU 34. However, benzo(a)pyrene (1.2 mg/kg) and antimony (103 mg/kg) were the only COCs that were detected above the applicable soil delineation criteria in samples collected from the zero to two-foot layer. Benzo(a)pyrene (1.2 mg/kg) was detected at SB0179, and antimony (103 mg/kg) was detected in the surface soil sample from S0728.

Fill Materials (>2 feet bgs)

Staining, odors, elevated PID readings and other evidence of petroleum impacts were noted in several of the subsurface fill samples at SWMU 34. The fill layer is generally between six and 20 feet thick at SWMU 34. As shown on the above table, a number of samples collected from the subsurface fill layer contain benzene, several PAHs and metals (antimony, arsenic, barium, beryllium, lead, nickel, zinc and naturally-occurring iron). The maximum concentration of benzene detected in the subsurface fill material was 8.36 mg/kg at S0728G3. The highest concentration of benzo(a)pyrene (9.3 mg/kg) was detected at S1432F2. Benzo(a)anthracene (1.6 mg/kg and 1.74 mg/kg) was the only PAH detected above the applicable soil delineation criterion at SB0143SC and S0728G3, respectively. SB0143SC was the only soil sample where there was an exceedance of an

organic constituent but where neither benzene nor benzo(a)pyrene were present above the applicable delineation criteria. In most cases, elevated metals were present in conjunction with elevated lead concentrations. However, antimony (225 mg/kg) and arsenic (43.4 mg/kg) were detected above the applicable soil delineation criteria in soil sample S1432F2, but lead was less than the delineation criteria in this particular sample. Arsenic (43.4 mg/kg) is well within the normal range for soils, particularly glauconitic soils in the Coastal Plain (Saunders, 2003).

The SPLP sample from S0729E2 contained 3.67 mg/L of naturally-occurring iron, which exceeds the applicable criteria for SPLP iron (3.3 mg/L)[2]. No other metals were detected above applicable SPLP criteria in this sample. Therefore, the soils are not a source of metal impacts to groundwater.

Native Material

Native material consisting primarily of clay, with some sand, silt and peat underlies the fill layer at depths ranging from approximately six to 20 feet bgs. Benzene, arsenic, barium, iron and lead were detected above the applicable soil delineation criteria in soil samples collected from the native material immediately underlying the fill layer. Arsenic (29.3 mg/kg), and lead (2,270 mg/kg) were detected in the native sample from S1394J4. This sample was collected from the clay immediately underlying the white and pink putty-like material observed at this location. Benzene (7.77 mg/kg), arsenic (34.3 mg/kg), and lead (697 mg/kg) were detected in the peat sample from S0727H3 at a depth of 15 to 15.5 bgs. Arsenic and lead were observed above the applicable soil delineation criteria in several other native soil samples as well. The maximum concentration of lead (11,000 mg/kg) was detected in the native sample from S029I3. This sample (S029I3), which also contained arsenic (22.4 mg/kg), barium: (2,120 mg/kg), and zinc (4,860 mg/kg) above the applicable soil delineation criteria, was collected from the clay layer underlying the peat layer at a depth of 17 to 17.5 feet bgs. Arsenic was detected above the applicable soil delineation criterion in native soils at concentrations ranging from 21.3 to 34.3 mg/kg, which is well within the normal range for soils, particularly glauconitic soils in the Coastal Plain (Saunders, 2003).

As discussed further in Section 6 of the RFI Report, lateral delineation of selected COCs has been completed on a site-wide basis for each Yard. The delineation of these COCs is depicted graphically on the figures provided in Section 6.

Groundwater

Benzene, chlorinated VOCs (1,1-dichloroethene, cis-1,2-dichloroethene, tetrachloroethene, trichloroethene and vinyl chloride), and metals (cadmium, cobalt and nickel) have been detected above the applicable groundwater delineation criteria in groundwater samples from monitoring wells at SWMU 34. The groundwater

[2]Based on the groundwater criterion for iron (300 µg/L), DAF = 11.

contamination observed in this area is believed to be originating from AOC 22 and/or AOC 36, which are located immediately to the north of SWMU 34. The identified groundwater plume associated with AOC 22/AOC 36 has been the subject of an ongoing investigation, as discussed in Section 8 of the RFI report.

Surface Water/Sediments

As discussed in more detail in Section 9 of the RFI Report, during the 1st-Phase Soils Investigation, PAHs, lead, mercury, nickel and total PCBs were detected in surface water and/or sediment samples above the applicable screening criteria. The City of Perth Amboy storm sewer line that runs through Chevron's property along the north end of SWMU 34 is likely to be the potential source of the PCBs, because Witco Chemical Company was responsible for discharge (and cleanup) of PCBs into this sewer line. In the past, water from the sewer man-way has been observed overflowing and discharging into the SWMU 34 drainage ditch. Thus, the sewer discharge is probably the source of the PCB in the ditch.

Summary

A number of COCs, including benzene, several PAHs and several metals (especially lead and arsenic), have been detected above the delineation criteria in soil samples collected from SWMU 34. With the exception of arsenic, lead and zinc, the metal exceedances are limited to surface and fill material; therefore, vertical delineation for these exceedances is complete. These constituents appear to be associated with a pink and white putty-like material that has been observed near the bottom of the fill layer at SWMU 34. Petroleum-impacted soils were observed in two borings located near the center of SWMU 34. The uppermost layer of the underlying native soils appears to have been impacted as well at this SWMU.

As discussed in Section 8 of the RFI Report, benzene, chlorinated VOCs and metals have been detected at several monitoring wells installed at SWMU 34. These organic constituents have migrated to SWMU 34 from AOC 22 and/or AOC 36, which are located upgradient and north of SWMU 34. SWMU 34 will be included for further evaluation in the CMS.